(**Adopted:** 01/09/76; **Amended:** 05/07/76; **Amended:** 07/09/76; **CARB Ex. Ord. G-73:** 02/01/77; **Readopted:** 07/25/77; **Amended:** 02/20/79; **Amended:** 12/19/88; **Amended:** 11/02/92)

RULE 463
Storage of Organic Liquids

(A) General Description

The purpose of this rule is to limit the emissions of volatile organic compounds (VOC) and toxic compounds (such as benzene) during the Storage of Organic Liquids, and in conjunction with Rules 461 and 462, limit the emissions from the storage, transfer, and dispensing of organic liquids, including bulk facilities, retail service stations, and others, the transport of fuels between these facilities and the transfer of fuel into motor vehicle tanks.

(B) Definitions

For the purposes of this rule, the following terms are defined.

(1) Gasoline: means any organic liquid, including petroleum distillate and methanol, having a Ried Vapor Pressure of 200 mm Hg (3.9 pounds per square inch), or greater, and used as a motor vehicle fuel, or any fuel which is commonly or commercially known or sold as gasoline.

(2) Organic Liquid: means any compound of carbon, including organic materials, organic solvents and gasoline, which is in a liquid phase at ambient or storage conditions.

(3) Organic Materials: means chemical compounds of carbon excluding: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates and ammonium carbonate.

(4) Organic Solvents: includes diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers or cleaning agents, except that such material exhibiting a boiling point higher than 104 ^{o}C (219^{o}F) at 0.5 mm Hg absolute pressure or having an equivalent vapor pressure shall not be considered to be solvent unless exposed to temperatures exceeding 104^{o}C (219^{o}F).

(C) Requirements

(1) Tanks Over 150,000 Liters In Capacity

No person shall place, store or hold in any stationary tank, reservoir or other container of more than 150,000 liters (39,630 gallons) capacity, any organic liquid having a true vapor pressure of 77.5 mm Hg (1.5 psia) or greater under actual storage conditions, unless such tank, reservoir or other container is a pressure tank maintaining working pressures sufficient at all times to prevent organic vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, properly maintained and in good operating order:

(a) An external floating roof, consisting of a pontoon-type or double-deck-type cover that rests on the surface of the liquid contents at all times, except as provided in Subsection (C)(3)(c) and is equipped with a closure device between the tank shell and roof edge. Except as provided in Subsections (C)(1)(a)(3) and (C)(1)(a)(4), the closure device shall consist of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal. Seal designs shall be submitted to the Air Pollution Control Officer (APCO) and shall not be installed or used unless they are approved by the APCO as meeting the criteria set forth in Section (F) - *Specifications For Closure Devices*, as applicable.

(i) For a closure device on a welded tank shell which uses a metallic-shoe-type seal as its primary seal: refer to Section (F)(1) for specifications.

(ii) For a closure device which used a resilient-toroid-type seal as its primary seal: refer to Section (F)(2) for specifications.

(iii) For a closure device on a reieted tank shell which uses a metallic-shoe-type seal as its primary seal: refer to Section (F)(3) for specifications.

(iv) EXEMPTION: The requirements of Subsections (F)(1) through (F)(3) shall not apply to any person who demonstrates to the APCO that a closure device has been installed, or is available for installation, which by itself or in conjunction with other vapor loss control devices, controls vapor loss at all tank levels with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1). This exemption is subject to the specifications of Section (F)(4) of this rule.

(v) ANNUAL INSPECTIONS: The primary seal envelope shall be made available for unobstructed inspection by the APCO on an annual basis at the location selected along its circumference at random by the APCO. In the case of riveted tanks with toroid-type seals, eight such locations shall be made available; in all other cases, four such locations shall be made

available. If the APCO detects one or more violations as a result of any such inspection, the APCO may require such further unobstructed inspection of the primary seal as may be necessary to determine the seal condition for its entire circumference. In addition, for tanks with secondary seals installed after February 20, 1979, the primary seal envelope shall be made available for inspection by the APCO prior to installation of the secondary seal. Thereafter, and for tanks with secondary seals installed before February 20, 1979, the primary seal envelope shall be made available for unobstructed inspection by the APCO for its full length every 5 years after February 20, 1979, except that if the secondary seal is voluntarily removed by the owner or operator prior thereto, it shall be made available for such inspection at that time. The owner or operator shall provide notification to the APCO no less than 7 working days prior to voluntary removal of the secondary seal.

(vi) All openings in the roof except pressure-vacuum valves, which shall be set to within ten percent of the maximum allowable working pressure of the roof, shall provide a projection below the liquid surface to prevent belching of liquid and to prevent entrained or formed organic vapor from escaping from the liquid contents of the tank and shall be equipped with a cover, seal, or lid. The cover, seal, or lid shall at all times be in closed position, with no visible gaps, except when the device or appurtenance is in use.

(vii) Any emergency roof drain shall be provided with a slotted membrane fabric cover, or equivalent, that covers at least nine-tenths of the area of the opening.

(viii) A floating roof shall not be used if the organic liquid stored has a true vapor pressure of 569 mm Hg (11 psi) absolute or greater under storage conditions.

(b) A fixed roof with an internal-floating-type cover that rests on the surface of the liquid contents at all times except as provided in Subsection (C)(3)(c) and is equipped with a closure device.

(i) For a fixed roof tank the closure device shall consist of either a liquid mounted primary seal only or two seals, a primary and a secondary seal. All openings and fittings shall be fully gasketed and/or controlled in a manner specified by the APCO . The closure device shall control vapor loss with an effectiveness equivalent to a closure device which meets the requirements of paragraph Subsection (F)(1). Internal floating roof and seal designs shall be submitted to the APCO and shall not be installed or used unless they are approved by the APCO.

(ii) A fixed roof container with an internal-floating-type cover shall not be used if the organic liquid stored has a true vapor pressure of 569 mm Hg (11 psi) absolute or greater under actual storage conditions.

(iii) Compliance shall be verified by measuring with an explosimeter the concentration of organic compound in the vapor space above the internal floating roof, in terms of the lower explosive limit (LEL). Such reading for an internal floating roof shall not exceed 50 percent of the LEL for those installed prior to December 19, 1988 and 30 percent of the LEL for those installed after December 19, 1988.

(iv) Visual Inspection of the secondary seal shall be performed by the tank operators semi-annually. A record of such inspection shall be maintained and such records shall be made available for review by the APCO upon request.

(v) The primary and secondary seals shall be inspected and repaired, if necessary, each time the tank is emptied and gas-freed. The APCO shall be notified at least 48 hours in advance of each such gas-freeing.

(c) A fixed roof tank with a vapor recovery system consisting of a system capable of collecting all organic vapors and gases, and a vapor return or disposal system capable of processing such vapors and gases, so as to prevent their emission to the atmosphere at an efficiency of at least 95 percent by weight.

(i) Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a gas-tight cover which shall be closed at all times except during gauging or sampling.

(ii) All piping, valves and fittings shall be constructed and maintained in a gas tight condition, such that no organic vapor or gas leaks are detectable.

(d) Other equipment having a vapor loss control efficiency of at least 95% by weight, provided an application for installation of such equipment is submitted to and written approval from the APCO prior to the commencement of construction and/or operation.

(2) Tanks With 150,000 Liters Or Less Capacity

A person shall not place, store or hold in any above-ground stationary tank, or other container of 150,000 liters (39,630) or less capacity any organic liquid having a true vapor pressure of 77.5 mm Hg (1.5 psia) or greater under actual storage conditions, unless such tank is equipped with a pressure-vacuum valve which is set to within ten percent of the maximum allowable working pressure of the container, or is equipped with a vapor loss control device which complies with the requirements set forth in Section (C)(1). The provisions of this section shall not apply to any container of 950 liters (251 gallons) or less capacity.

(3) Additional Requirements

(a) All of the components of a facility including but not limited to tanks, flanges, seals, pipes, pumps, valves, meters, connectors, shall be maintained and operated so as to prevent fugitive vapor leaks, fugitive liquid leaks, and excess organic liquid drainage during transfer, storage and handling operations.

(b) Efficiency, as used in Subsections (C)(1)(c) and (c)(1)(d) means a comparison of controlled emissions to those emissions which would occur from a fixed or cone roof tank in the same product service without a vapor control system. Base line emissions shall be calculated by using the criteria outlined in American Petroleum Institute Bulletin 2518.

(c) The roof of any internal or external floating roof tank is to be floating on the liquid at all times (i.e. free of the roof leg supports) except when the tank is being completely emptied for cleaning, or repair. The process of emptying, and/or refilling, when the roof is resting on the leg supports, shall be continuous and shall be accomplished as rapidly as possible, and:

If the tank has been gas-freed and is to be refilled with gasoline, the roof shall be refloated with water, or equivalent procedure approved by the APCO.

(D) Record Keeping and Recording

(1) A person whose tanks are subject to this rule shall keep an accurate record of liquids stored in such containers and the true vapor pressure ranges of such liquids, or other criteria approved by the APCO.

(2) Organic liquids listed on the addendum to this rule shall be deemed to be in compliance with the appropriate vapor pressure limits for the tank in which it is stored provided the actual storage temperature does not exceed the corresponding maximum temperature listed.

(3) The owner or operator shall maintain a log of all inspections, repairs and maintenance on equipment subject to this rule. Such a log or records shall be maintained at the facility for at least 2 years and shall be made available to the APCO upon request.

(E) Exemptions

(1) The provisions of Subsection (C)(3)(c) shall not apply to gasoline storage tanks at bulk gasoline distribution terminals which do not have:

(a) existing facilities for treatment of waste water used to refloat the tank roof; or

(b) facilities for equivalent emission control when refloating the roof with product.

(2) Notwithstanding the secondary and primary seal requirements of subparagraphs (F)(1), a secondary or primary seal may be loosened or removed for preventive maintenance, inspection and/or repair upon prior notification and subject to the prior written approval of the APCO and for a period not exceeding 72 hours.

(F) Specifications For Closure Devices

(1) For a closure device on a welded tank shell which uses a metallic-shoe-type seal as its primary seal:

(a) Gaps between the tank shell and the primary seal shall not exceed 3.8 centimeters (1-1/2 inches) for an accumulative length of 10 percent, 1.3 centimeters (1/2 inch) for another 30 percent, and 0.32 centimeters (1/8 inch) for the remaining 60 percent of the circumference of the tank. No gap between the tank shell and the primary seal shall exceed 3.8 centimeters (1-1/2 inches). No continuous gap greater than 0.32 centimeters (1/8 inch) shall exceed 10% of the circumference of the tank.

(b) Gaps between the tank shell and the secondary seal shall not exceed 0.32 centimeters (1/8 inch) for an accumulative length of 95 percent of the circumference of the tank, and shall not exceed 1.3 centimeters (1/2 inch) for an accumulative length of the remaining 5 percent of the circumference of the tank. No gap between the tank shell and the secondary seal shall exceed 1.3 centimeters (1/2 inch).

(c) Metallic-shoe-type seals installed on or after date of adoption of this rule, shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 61 centimeters (24 inches) above the stored liquid surface.

(d) The geometry of the shoe shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria for a length of at least 46 centimeters (18 inches) in the vertical plane above the liquid surface. There shall be no holes or tears in, or openings which allow the emission of organic vapors through the secondary seal or in the primary seal envelope surrounding the annular vapor space enclosed by the roof edge, stored liquid surface, shoe, and seal fabric. (A typical metallic-shoe-type seal with a pantagraph-type hanger is shown in Figure 1. This sketch is for illustrative purposes only and does not constitute endorsement of any product or company.)

(e) The secondary seal shall allow easy insertion of probes up to 3.8 centimeters (1-1/2 inches) in width in order to measure gaps in the primary seal.

(f) The secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.

(2) For a closure device which used a resilient-toroid-type seal as its primary seal:

(a) If installation was commenced prior to February 20, 1980, gaps between the tank shell and the primary seal shall not exceed 0.32 centimeters (1/8 inch) for an accumulative length of 95 percent of the circumference of the tank, and shall not exceed 1.3 centimeters (1/2 inch) for an accumulative length of the remaining 5 percent of the tank circumference. No gap between the tank shell and the 2primary seal shall exceed 1.3 centimeters (1/2 inch).

(b) If installation was commenced prior to February 20, 1980 gaps between the tank shell and the secondary seal shall not exceed 0.32 centimeters (1/8 inch) for an accumulative length of 95 percent of the circumference of the tank, and shall not exceed 1.3 centimeters (1/2 inch) for an accumulative length of the remaining 5 percent of the tank circumference. No gap between the tank shell and the secondary seal shall exceed 1.3 centimeters (1/2 inch). (A typical

resilient-toroid-type seal with resilient-foam-type filling is shown in Figure 2. This sketch is for illustrative purposes only and does not constitute endorsement of any product or company.)

(c) If installation is commenced after February 20, 1980, the tank owner or operator shall, prior to installation, demonstrate to the Air Pollution Control Officer, that the closure device controls vapor loss with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1)(a). The Air Pollution Control Officer shall determine whether equivalence exists in accordance with Subsection (C)(1)(a)(4). If equivalence is demonstrated using primary or secondary seal gap criteria (if any) different from the criteria specified in Subsections (F)(2)(a) or (b), those criteria shall be controlling for all purposes of this rule in lieu of the criteria specified in Subsections (F)(2)(a) and (b).

(d) There shall be no holes or tears in, or openings which allow the emission of organic vapors through the secondary seal or in the primary seal envelope surrounding the annular vapor space enclosed by the roof edge, seal fabric and secondary seal.

(e) The secondary seal shall allow easy insertion of probes up to 3.8 centimeter (1-1/2 inches) in width in order to measure gaps in the primary seal.

(f) The secondary seal shall extend from the roof of the tank shell and not be attached to the primary seal.

(3) For a closure device on a riveted tank shell which uses a metallic-shoe-type seal as its primary seal;

(a) The closure device shall consist of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal.

(b) The closure device shall control vapor loss with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1). The Executive Officer shall determine whether equivalence exists in accordance with Subsection (C)(1)(a)(4). Gaps between the primary and secondary seals shall not exceed the gaps (if any) associated with the closure device approved as equivalent by the APCO, and shall be controlling for all purposes of this rule.

(c) Metallic-shoe-type seals installed on or after February 20, 1979 shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 61 centimeters (24 inches) above the stored liquid surface. The geometry of the shoe shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria for a length of at least 46 centimeters (18 inches) in the vertical plance. (A typical metallic-shoe-type seal with a pantagraph-type hanger is shown in Figure 1. This sketch is for illustrative purposes only and does not constitute endorsement of any product or company).

(d) There shall be no holes or tears in, or openings which allow the emission of organic vapors through the envelope surrounding the annular vapor space enclosed by the roof edge, stored liquid surface, shoe, and seal fabric.

(e) Any secondary seal shall allow easy insertion of probes up to 6.4 centimeters (2-1/2 inches) in width in order to measure gaps in the primary seal.

(f) Any secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.

(4) The owner or operator of any tank with such a system, or proposed to be equipped with such a system, shall, prior to use on installation, demonstrate equivalence to the APCO as follows:

(a) By an actual emissions test in a full-size or scale sealed tank facility which accurately collects and measures all hydrocarbon emissions associated with a given closure device, and which accurately simulates other emission variables, such as temperature, barometric pressure and wind. The test facility shall be subject to prior approval by the APCO, or,

(b) By a pressure leak test, engineering evaluation or other means, where the APCO determines that the same is an accurate method of determining equivalence.

(G) If any portion of this rule shall be found to be unenforceable, such finding shall have no effect on the enforceability of the remaining portions of the rule, which shall continue to be in full force and effect.

(H) Compliance Verification Test Methods*

(1) Vapor Pressure shall be determined in accordance with ASTM Method D 323-82, or the unmodified Reid Method and the true vapor pressure in psi absolute of stored liquid shall be determined by using the nomographs contained in American Petroleum Institute Bulletin 2517 for conversion of Reid vapor pressure to true vapor pressure.

(2) Vapor Tightness (Fugitive Vapor Leaks) for all equipment described in Section (C) shall be determined by EPA Method 21 - *Determination of Volatile Organic Compounds Leaks.*

(3) Vapor Tightness for delivery vessels shall be determined by the EPA Method entitled *Control of Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems* (method specified in the CTG EPA-450/2-78-051), or the CARB Method entitled, "Certification and Test Procedures for Vapor Recovery Systems of Gasoline Delivery Tanks".

(4) Vapor Tightness for bulk plants shall be determined by CARB Method 202, "Certification of Vapor Recovery Systems - Bulk Plants".

(5) Vapor Tightness terminals shall be determined by CARB Method 203, "Certification of Vapor Recovery Systems - Gasoline Terminals".

(6) Vapor Tightness for service stations shall be determined by the CARB Methods in "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations".

* A violation determined by any one of these test methods shall constitute a violation of the rule.

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
RULE 463 - ADDENDUM

STORAGE TEMPERATURES vs. ACTUAL VAPOR PRESSURE
(gravity/initial boiling points referenced)

	Reference Property A - NAPI B - IBP, NF		Temperature, NF Not to Exceed Vapor Pressure	
Organic Liquids	A	B	0.5 pisa	1.5 pisa
Crude Oils	12	---	---	---
	13	---	120	180
	14	---	85	145
	16	---	60	107
	18	---	55	93
	20	---	52	84
	22	---	49	77
	24	---	45	73
	26	---	42	70
	28	---	40	67
	30	---	38	64
Middle Distillates				
Kerosene	42.5	350	195	250
Diesel	36.4	372	230	290
Gas Oil	26.2	390	249	310
Stove Oil	23	421	275	340
Jet Fuels				
JP-1	43.1	330	165	230
JP-3	54.7	110	---	25
JP-4	51.5	150	20	68
JP-5	39.6	355	205	260
JP-7	44-50	360	205	260

	Reference Property A - NAPI B - IBP, NF		Temperature, NF Not to Exceed Vapor Pressure	
Fuel Oil				
# 1	42.5	350	195	250
# 2	36.4	372	230	290
# 3	26.2	390	249	310
# 4	23.0	421	275	340
# 5	19.9	560	380	465
# 6	16.2	625	450	---
Asphalts				
60-100 pen.	---	---	490	550
120-150 pen.	---	---	450	500
200-300 pen.	---	---	360	420
Acetone	47.0	133	---	35
Acrylonitrile	41.8	173	30	60
Benzene	27.7	176	35	70
Cyclohexane	49.7	177	35	70
Ethylacetate	23.6	171	35	70
Ethyl Alcohol	47.0	173	45	83
Isopropyl Alcohol	47.0	181	45	87
Methyl Alcohol	47.0	148	---	50
Mehylethyl Ketone	44.3	175	30	70
Toluene	30.0	231	73	115
Vinyl Acetate	19.6	163	---	60
Carbon Disulfide	10.6	116	---	10
Carbon Tetra-Chloride	13.4	170	30	60
Chloroform	12.5	142	---	40

	Reference Property A - NAPI B - IBP, NF		Temperature, NF Not to Exceed Vapor Pressure	
1,2-Dichloro-ethane	10.5	180	35	77
Methylene Chloride	11.1	104	---	70
1,1,1-Trichloro-ethane	11.2	165	60	100
Trichloroethylene	12.3	188	50	91

[SIP: Approved 5/3/95, 60 FR 21702, 40 CFR 52.220(c)(191)(i)(C); Approved 6/9/82, 47 FR 25013, 40 CFR 52.220(c)(xii)(B); Approved _____, _____, 40 CFR 52.220(c)(42)(xiii)(A)]

[This Page Intentionally Left Blank]